

ART 34 AMDT

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1      **Claims**

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3      1. Use of a fluorescent dye doped polymer as an  
4                optical fibre, a film or a sheet in a visual  
5                display, in which fluorescent light is generated  
6                when artificial ambient light, daylight or  
7                sunlight enters the doped polymer or optical  
8                fibres, characterised in that the optically  
9                transparent polymer is doped or blended with  
10               organic fluorescent dye molecules chosen from a  
11               group comprising PBD, Bis-MSB, 3-3'-  
12               diethyloxycarbocyanine-iodide, cresyl violet 670  
13               perchlorate, coumarin 6, coumarin 7, coumarin  
14               314, 1,8-Diphenyl-1,3,5,7,-octatetrene, Nile  
15               red, Sulforhodamine 101 and Solforhodamine 640.

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17      2. Use of a polymer as claimed in Claim 1 wherein  
18               the transparent polymer is chosen from the group  
19               comprising PMMA, polycarbonate and polystyrene.

20

21      3. Use of a polymer as claimed in Claim 1 wherein  
22               the polymer is an optical fibre, the radius of  
23               which is between  $0.25$  and  $0.70 \times 10^{-2}$  meters and  
24               the length of the fibre is between 0.2 and 1.6  
25               meters.

26

27      4. Use of a polymer as claimed in Claim 3 wherein  
28               the magnitude of the fluorescent light emitted  
29               from such a fibre is given by the equation  
30                $A_a/A_e = 2L/r$  wherein  $A_a$  is the surface area of the

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1 fibre and Ae is the area at which the  
2 fluorescent light is emitted.

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4 5. A display comprising a fluorescent dye doped  
5 polymer as defined in any of the preceding  
6 claims, consisting of a plurality of fibres  
7 which may include individual fibres, a film or a  
8 sheet, which polymer when excited by light emits  
9 the characteristic colour of the dye,  
10 characterised in that the polymer is doped with  
11 a combination of dyes.

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13 6. A display as claimed in Claim 5 wherein the  
14 polymer is doped with two or three dyes

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16 7. A display as claimed in Claim 6 wherein the  
17 polymer is doped with Nile Red and Coumarin 6.

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19 8. A display as claimed in Claim 6 wherein the  
20 polymer is doped with Nile Red 0.04% and  
21 Coumarin 6.

22

23 9. A display as claimed in Claim 6 wherein the  
24 polymer is doped with Nile Red 0.04%, Coumarin 6  
25 and Bis-MSB.

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27 10. A display as claimed in any one of Claims 5 to 9  
28 consisting of a plurality of fibres acting as  
29 pixels.

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1        11. A display as claimed in any one of Claims 5 to 9  
2        in a flat panel conformation wherein the bottom  
3        surfaces and edges of the polymer film are  
4        covered with a highly reflective additional  
5        layer which acts as a mirror performing the role  
6        of total internal reflection of all light  
7        entering into the polymer.

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9        12. A flat panel display as claimed in Claim 11  
10      whereby the top surface of the polymer is  
11      covered with a dielectric polymer film.

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13      13. A flat panel display as claimed in Claim 11 or  
14      Claim 12 wherein the stack is constituted of an  
15      alternating sequence of two dielectric films  
16      with alternately high and low refractive  
17      indices.

18

19      14. A flat panel display as claimed in Claim 12  
20      comprising a dielectric stack whereby the  
21      composition of this dielectric stack acts as an  
22      interference filter to allow substantially 100%  
23      transmission of light from air into the polymer  
24      for wavelengths used for excitation of the dye.

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26      15. A flat panel display as claimed in any one of  
27      Claims 11 to 13 where the stack has  
28      substantially 100% reflection for light  
29      wavelengths emitted from the fluorescent dyes,  
30      the dielectric layers have been vacuum

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1        evaporated, spin coated or sputtered onto the  
2        ~~surface of the polymer.~~

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4        16. A display as claimed in Claim 14 whereby thin  
5        films of two different polymers, with the two  
6        different refractive indices, can be applied to  
7        the polymer surface sequentially and vacuum  
8        pressed and/or thermally treated for each layer.  
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